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Crop Diversification In The State Of Telangana

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I. Introduction

Crop diversification refers to the addition of new crops or cropping systems to agricultural production on a particular farm, taking into account the different returns from value- added crops with complementary marketing opportunities and other factors. Crop diversification provides better conditions for food security and enables farmers to grow surplus products for sale at market and thus helps to obtain increased income. However, crops are subject to multiple risks. Therefore, there is a distinction between diversification helping only in coping with risks and diversification prompted by a strategy for increase in income (R.P Gupta et al 1977). Studies show that crop diversification in India is getting gradually oriented towards food grain crops, particularly wheat and rice, and a few commercial crops like cotton (A J Singh 1977). Crop diversification in macro perspective aims at measuring the extent of crop diversification in Index form (ex., Herfindahl Index, Entropy index) for the state as a whole (A J Singh et al 1977). The major determinants of crop diversification include farm size that is found to be inversely related (R. P Gupta et al 1977),irrigation intensity, market density, fertiliser consumption and tractor density representing technology change, inter-crop value productivity variabilityetc. On the other hand, at the micro level, distance from market, assets per hectare, and directly related to family size, family size and income from other sub sectors in agriculture, such as dairy. Studies show that irrigation intensity, farm net worth, price risk and farm size etc., appeared to be the strong variables effecting the level of crop diversification. The measures of crop diversification include crop acreage or net crop income or a combination of other important factors that influence the choice of crop/s like irrigation intensity, farm size, market access etc.

Farm decisions on the selection of crops are subject to various kinds of yield risks and price risks attendant with respective crops and expected returns from them. As such Cropdiversification involves basic principles of farm management such as risk-minimisation(Earl O. Heady and Harald 1964), income maximisation (economic optimum), (Earl O Heady 1961)and very recently, the concept of sustainable development of cropsStudies show that their results are consistent with risk theoriesThus farm decisions are constrained by several factors such as availability of resources, that vary from farm to farm and one region to the other owing to differences in agro-climatic conditions and other resource situations. It has temporal and regional dimensions and there is a need to study crop diversification at the regional level as well as at different time periods in a dynamic setting.

II. Objective and Method

The main objective of the Paper is to discuss the extent and nature of crop diversification in Telangana State in temporal situations- during three decades from 1991 to 2021 by season at aggregate level and spatially, across different regions/districts in the State and cross sectional diversification by farm size.Further, it discussesthe causative factors that effect changes in the copping pattern and workout the policy implications and actions for the future. The main sources of data include secondary sources like Government Documents and Reports, and past studies on the subject. There are a number of statistical methods available in the literature to measure the magnitude of diversification. Each and every method has their own advantages and limitations due to nature of data each formula deals with and specific purpose of interpretation. Gibbs and Martin's technique is employed for this study because it is best suited on continuous data of areal extent of crops. Gibbs and Martin's technique is defined as-

Crop Diversification Technique= **1-** $\Sigma X^2 / (\Sigma X)^2$

Here, X is the percentage of total cropped area occupied by an individual crop at a point of time. The index value of this technique ranges from 0 to 1. It is directly related to the magnitude of diversification, i.e., higher the index value, higher would be the diversity and vice-versa.

Temporal changes in the Crop Composition in Telangana

Table-1 Indicates Gibs and Martins Crop Diversification Index for principal crops in the State of Telangana which is measure of crop diversification during the period from 1991-92 to 2020-21.During the year 1991-92 had recorded 0.0639. It further witnessed a gradual increased in the crop diversification i.e 0.65729 to 0.667675 between the years 1996-97 and 2001-02. Later crop diversification gradually declining from 0.657675 to 0.57335 between the years 2011-12 to 2020-21**.**For long, Telangana region exhibited subsistence agriculture with predominance of food grains (90 %) like jowar, rice, maize in cereals and millets, pulses in green gram and red gram and oil seeds in groundnut, sesame. Non-food crops accounted for hardly 20 % (1960s). As with improvement in irrigation, superior food grains like rice continued to increase its share from the beginning, way back from Kakatiyas under tanks. With growth of rural electrification since 70's and basically, the outcome of technological change reflected in HYV seeds, fertilizer, pesticides and mechanization etc., rice continued to increase its share in 70's and 80's. The high-yielding varieties in rice which resulted in improving productivity further shifted comparative advantage in favour of this crop. Marked change is noticed very recently, after the State formation in 2014 and more particularly in 2020-21, when it almost doubled due to higher irrigation intensity.

Table-1 Area of PrincipalCrops in Telangana from 1991-1992 to 2020-21 in Lakh Hectares

S.No	Crop	1991-92	1996-97	2001-02	2006-07	2011-12	2020-21
1	Cereals &Millets(a)	25.39	24.00	22.48	23.95	24.91	45.86
		(53.30)	(51.25)	(49.30)	(51.68)	(46.53)	(57.36)
2	Pulses(b)	6.96	6.51	7.14	6.84	6.18	6.92
		(14.61)	(13.90)	(15.66)	(14.76)	(11.54)	(8.66)
3	food grains(c) = (a+b)	32.35	30.51	29.62	30.79	31.09	52.78
		(67.91)	(65.15)	(64.96)	(66.44)	(58.08)	(66.02)
4	Oil seeds (d)	9.52	8.09	6.12	6.06	4.47	3.36
		(19.98)	(17.28)	(13.42)	(13.08)	(8.35)	(4.20)
5	Others(Non Food grain) (e)	5.77	8.23	9.86	9.49	17.97	23.82
		(12.11)	(17.57)	(21.62)	(20.48)	(33.57)	(29.79)
6	Gross Cropped Area	47.64	46.83	45.60	46.34	53.53	79.95
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
7	**Crop Diversification Index**	**0.63998**	**0.65729**	**0.667675**	**0.65208**	**0.65045**	**0.57335**

Note: Figures in parentheses indicate percentages of respective groups of crops to Gross Cropped Area (GCA)

Source: Directorate of Economics & Statistics & Agriculture at a Glance-2013-14

Crop-category level Analysis

The disaggregated analysis at the crop level shows that paddy, maize and red gram in food grains, and cotton in non-food crops increased their share while the traditional subsistence crops like jowar, green gram, sesamum and ground nut lost their area and share in the earlier period prior to 1991. During the study period, the share of paddy was growing continuously, due to development of irrigation facilities. Among the non-food crops, cotton gained substantially. Presently, these two crops together share about 86.65 % of total cropped area which was 80.94 % in 1991.

Cereals and Millets Group

Table-2 Shows Crop Diversification Index for Total Cereals & Millets in Telangana which is measure of crop diversification during the period from 1991-92 to 2020-21.During the year 1991-92 had recorded 0.611435. It further witnessed a gradual declined in the crop diversification i.e 0.582271 to 0.150377 between the years 1996-97 and 2020-21.Within the cereals and millets group, rice and maize tended to rise in area as well as percentage share in that group of total cropped area (Table 2). Rice tended to increase more in the later period from 2011-12 where it went up from 17.5 lakh hectares to 42.18 lakh hectares while its share increased from 70.25 % to 91.98 %. In the case of maize, it constantly went up in area up to 2011-12, but in the later period, it fell slightly in terms of area as well as in its share. The rest of the crops in this group continue to lose their areas and shares, and more predominantly, jowar which occupied 31.78 % share in 1991-92 and declined to 1.98 % in 2020-21. Changes in cropping pattern diversification in this group led to the concentration of rice and, to some extent, maize.

Table-2 Area and Share of Total Cereals & Millets in Telangana from 1991-92 to 2020-21 in Lakh Hectares							
Sl.No	Crop	1991-92	1996-97	2001-02	2006-07	2011-12	2020-21
1	Rice	13.29 (52.34)	13.60 (56.67)	13.09 (58.23)	14.89 (62.17)	17.50 (70.25)	42.18 (91.98)
2	Wheat	0.07 (0.28)	0.11 (0.46)	0.12 (0.53)	0.09 (0.38)	0.08 (0.32)	0.06 (0.13)
3	Jowar	8.07 (31.78)	6.51 (27.13)	5.09 (22.64)	2.80 (11.69)	1.29 (5.18)	0.91 (1.98)
4	Bajra	0.64 (2.52)	0.45 (1.88)	0.36 (1.60)	0.20 (0.84)	0.11 (0.44)	0.10 (0.22)
5	Maize	2.87 (11.30)	3.00 (12.50)	3.70 (16.46)	5.91 (24.68)	5.91 (23.73)	2.59 (5.65)
6	Ragi	0.35 (1.38)	0.27 (1.13)	0.10 (0.44)	0.05 (0.21)	0.02 (0.08)	0.01 (0.02)
7	Small Millets	0.10 (0.39)	0.06 (0.25)	0.02 (0.09)	0.01 (0.04)	0.00 (0.00)	0.01 (0.02)
8	Total Cereals & Millets(A)	25.39 (100.00)	24.00 (100.00)	22.48 (100.00)	23.95 (100.00)	24.91 (100.00)	45.86 (100.00)
9	**CDI**	**0.611435**	**0.589117**	**0.582271**	**0.538824**	**0.447469**	**0.150377**

Note: Figures in parentheses indicate percentages to total.
Source: Directorate of Economics & Statistics & Agriculture at a Glance-2013-14

Pulses category

Table-3 Indicates Crop Diversification Index for Pulses Crops in the State of Telangana which is measure of crop diversification during the period from 1991-92 to 2020-21.During the year 1991-92 had recorded 0.653239. The results indicate that there was little variation between the years 1996-97 and 2001-02. It further witnessed a gradual increased in the crop diversification i.e 0.693159 to 0.720155 between the years 1996-97 and 2006-07. Later crop diversification gradually declining from 0.676431 to 0.559444 between the years 2011-12 to 2020-21. During the study period, highest crop diversification recorded in the year2006-07.Greengram was the predominant crop among pulses in 1991-92 followed by Redgram and Bengalgram (Table 3). Red gram and Bengalgram witnessed on increase in area as well as in relative shares in total pulses, while all other pulses lost their area as well as their share.

Table-3 Area of Pulses Crops in Telangana from 1991-1992 To 2020-21 in Lakh Hectares							
Sl.No	Crop	1991-92	1996-97	2001-02	2006-07	2011-12	2020-21
1	Redgram	2.05	1.84	2.28	2.50	2.99	4.29
		(29.45)	(28.26)	(31.93)	(36.55)	(48.38)	(61.99)
2	Greengram	3.46	2.94	3.02	2.27	1.48	0.75
		(49.71)	(45.16)	(42.30)	(33.19)	(23.95)	(10.84)
3	Blackgram	0.62	0.85	1.06	0.80	0.70	0.38
		(8.91)	(13.06)	(14.85)	(11.70)	11.33	(5.49)
4	Horsegram	0.41	0.33	0.19	0.10	0.03	0.02
		(5.89)	(5.07)	(2.66)	(1.46)	(0.49)	(0.29)
5	Bengalgram	0.23	0.35	0.40	1.01	0.85	1.43
		(3.30)	(5.38)	(5.60)	(14.77)	(13.75)	(20.66)
6	Cowgram	0.13	0.13	0.12	0.13	0.12	0.06
		(1.87)	(2.00)	(1.68)	(1.90)	(1.94)	(0.87)
7	Other Pulses	0.06	0.07	0.07	0.03	0.01	0.00
		(0.86)	(1.08)	(0.98)	(0.44)	(0.16)	(0.00)
8	Total Pulses(B)	6.96	6.51	7.14	6.84	6.18	6.92
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
9	**CDI**	**0.653239**	**0.693159**	**0.692844**	**0.720155**	**0.676431**	**0.559444**

Note: Figures in parentheses indicate percentages to total
Source: Directorate of Economics & Statistics & Agriculture at a Glance-2013-14

Oil Seeds Group

. Table-4 Shows Gibs and Martins Crop Diversification Index for Oil Seeds Crops in the State of Telangana which is measure of crop diversification during the period from 1991-92 to 2020-21.During the period 2006-07 had recorded highest Crop diversification i.e 0.77154. The results indicates that there was slide variation between the years 1996-97 and 2001-02. It further witnessed a gradual decline in the crop diversification of Oil Seeds i.e 0.724712 to 0.614782 between the years 2011-12 and 2020-21.In 1991-92 (Table 4) Groundnut was a predominant crop in total Oil seeds followed by castor. In the recent period, a new crop (soya bean), introduced in 2006-07, has emerged as the dominant crop followed by ggroundnut. Sesamum lost its area but retained the relative share at 6.85%. Another new crop viz., palm oil, that was introduced in 2006-07, forms a minute part

Table-4. Area of Oil Seeds Crops in Telanganafrom 1991-1992 to 2020-21 in Lakh Hectares

S.NO	CROP	1991-92	1996-97	2001-02	2006-07	2011-12	2020-21
1	Groundnut	5.06	3.82	2.37	1.79	1.71	1.27
		(53.15)	(47.22)	(38.73)	(29.54)	(38.26)	(37.80)
2	Sesame	0.66	0.80	0.59	0.50	0.20	0.23
		(6.93)	(9.89)	(9.64)	(8.25)	(4.47)	(6.85)
3	Sunflower	0.72	0.88	0.28	0.75	0.24	0.07
		(7.56)	(10.88)	(4.58)	(12.38)	(5.37)	(2.08)
4	Castor	2.91	2.24	2.50	1.82	0.91	0.10
		(30.57)	(27.69)	(40.85)	(30.03)	(20.36)	(2.98)
5	Soya bean	0.00	0.00	0.00	1.02	1.28	1.62
		(0.00)	(0.00)	(0.00)	(16.83)	(28.64)	(48.21)
8	Safflower	0.11	0.20	0.14	0.14	0.10	0.03
		(1.16)	(2.47)	(2.29)	(2.31)	(2.24)	(0.89)
9	Nigerseed	0.01	0.01	0.01	0.00	0.00	0.00
		(0.11)	(0.12)	(0.16)	(0.00)	(0.00)	(0.00)
10	Linseed	0.05	0.09	0.06	0.03	0.00	0.00
		(0.53)	(1.11)	(0.98)	(0.50)	(0.00)	(0.00)
11	Rape& Mustard	0.00	0.00	0.00	0.00	0.00	0.02
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	0.60
12	Palm Oil	0.00	0.00	0.00	0.01	0.03	0.00
		(0.00)	(0.00)	(0.00)	0.17	0.67	(0.00)
13	Other Oil Seeds	0.00	0.05	0.17	0.00	0.00	0.00
		(0.00)	0.62	2.78	(0.00)	(0.00)	(0.00)
14	Total Oil Seeds	9.52	8.09	6.12	6.06	4.47	3.36
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
15	**CDI**	**0.613375**	**0.677962**	**0.670346**	**0.77154**	**0.724712**	**0.614782**

Note: Figures in parentheses indicate percentages to total
Source: Directorate of Economics & Statistics & Agriculture at a Glance-2013-14

Other Crops Group

Table-5 Indicates Crop Diversification Index for Other Crops in the State of Telangananwhich is measure of crop diversification during the period from 1991-92 to 2020-21.During the period 1991-92 had recorded highest Crop diversification i.e 0.544398. The results indicates that there was huge variation of crop diversification in other crops during the study period. It further witnessed a gradual decline in the crop diversification of other crops i.e 0.544398 to 0.020007 between the years 1991-92 and 2020-21. Among other crops, cotton is the predominant crop Its share steadily increased and reached to about 90.0 per cent in 2011-12 from 64.3 per cent in 1991-92. Turmeric has slightly gone up in area but lost in its share during the later period. The area under sugar cane and onion increased up to 2006-07, but, began to lose their area as well as share during the later period. Chillies, with considerable share in 1991-92, have lost marginally in area, and more so in its share over the period (Table 5), Tobacco lost in area and its share during the Study period. Thus, in other crop group, there is heavy concentration on cotton, at the expense of almost all other crops.

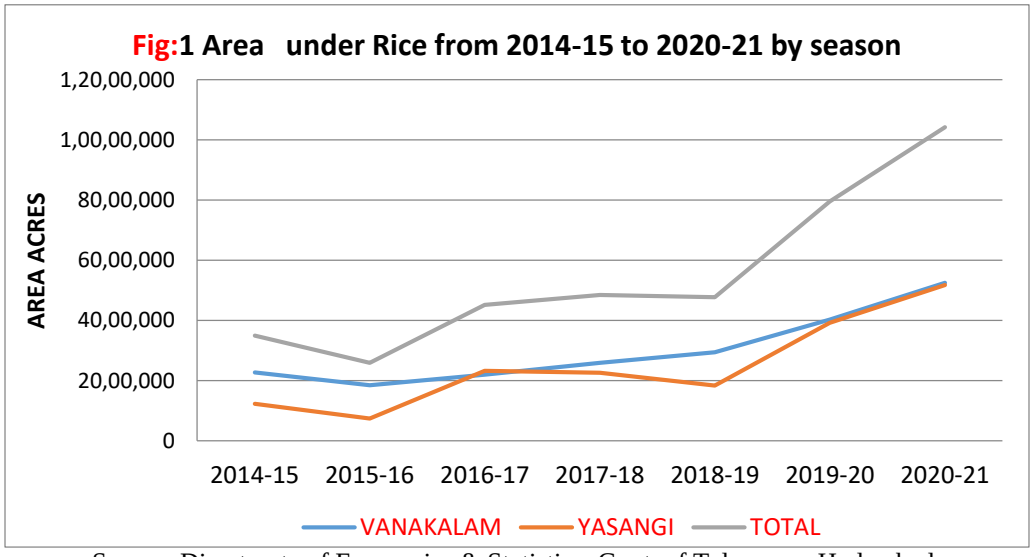
Table-5: Area of Other Crops in Telangana from 1991-1992 to 2020-21 in Lakh Hectares							
1	2	3	4	5	6	7	8
S.No	Crop	1991-92	1996-97	2001-02	2006-07	2011-12	2020-21
1	Chillies	1.05	1.29	0.98	0.92	0.90	na
		(18.20)	(15.67)	(9.94)	(9.69)	(5.01)	(0.00)
2	Onions	0.07	0.08	0.12	0.11	0.17	na
		(1.21)	(0.97)	(1.22)	(1.16)	(0.95)	(0.00)
3	Sugarcane	0.29	0.44	0.55	0.57	0.45	0.22
		(5.03)	(5.35)	(5.58)	(6.01)	(2.50)	(0.92)
4	Turmeric	0.34	0.42	0.49	0.50	0.55	na
		(5.89)	(5.10)	(4.97)	(5.27)	(3.06)	(0.00)
5	Cotton	3.71	5.79	7.61	7.30	15.81	23.58
		(64.30)	(70.35)	(77.18)	(76.92)	(87.98)	(98.99)
6	Mesta	0.00	0.00	0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
7	Tobacco	0.31	0.21	0.11	0.09	0.09	0.01
		(5.37)	(2.55)	(1.12)	(0.95)	(0.50)	(0.04)
8	Total OtherCrops	5.77	8.23	9.86	9.49	17.97	23.82
		(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)
9	**CDI**	**0.544398**	**0.47432**	**0.388589**	**0.392328**	**0.221765**	**0.020007**

Note: Figures in parentheses indicate percentage to total
Source: Directorate of Economics &Statistics &Agriculture at a Glance-2013-14

Crop Diversificationby Season (2014-15 to 2020-21)

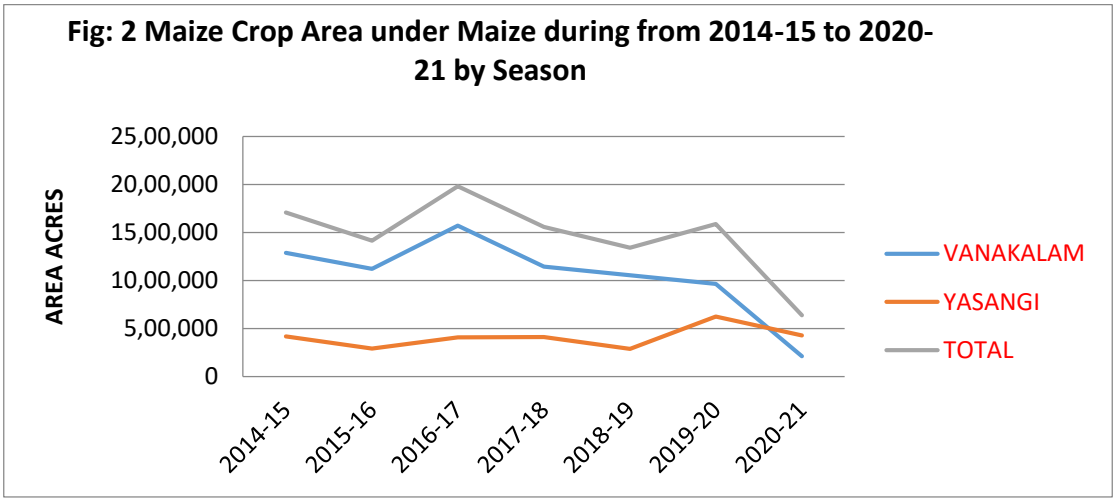
The overall percentage share of crop area in Kharif has been declining while that of Rabi increasing. The gap has been declining during the study period with growth of cropped area under irrigation.Rice, maize, groundnut and to some extent red gram are principal irrigated crops in Rabi. Rice accounts for the largest share in area and share in total area cultivated in Rabi. The relative position of these select crops for Kharif and Rabi for 2014-15 to 2020-21, is shown in Fig: 1 to 4.

i) **Rice:** The possible explainion for increasing share of rice in the GCA is attributable to two trends i.e., a constant rise in area under rice in Kharif since 2015-16 and increasing area under rice in Rabi which has been growing at high rate in the recent years (Fig: .1). The overall growth of rice area is determined more by the area increase in rice in Rabi. Rabi crops being grown mostly under irrigation conditions, its share depends on irrigation intensity that has been rising over the period. More than 90 % of Rabi crops is occupied by rice alone, indicating the high level of rice concentration in Rabi, the area of which in Rabi has almost reached the level of rice crop in Kharif by 2019-20 and continued in 2020-21.



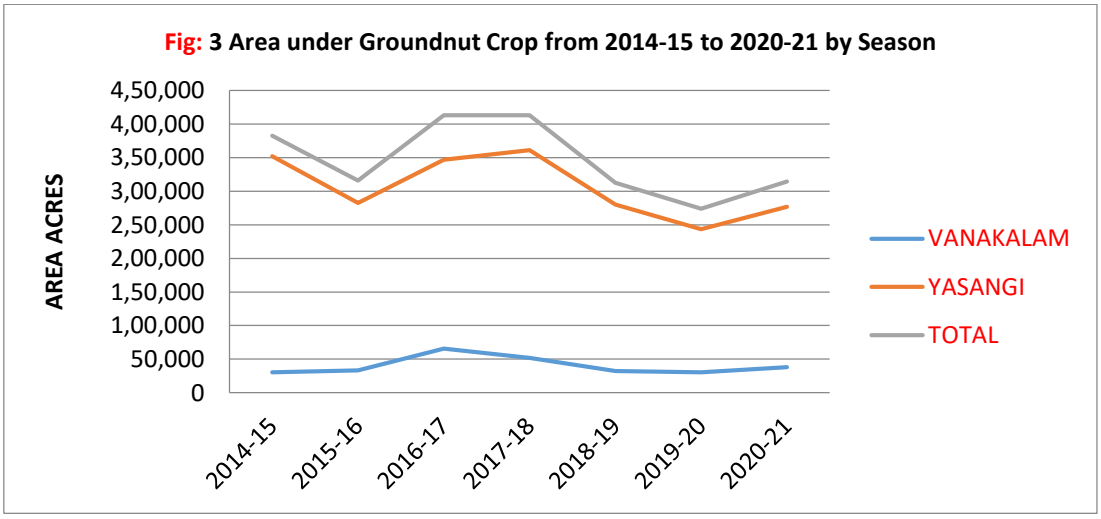
Source: Directorate of Economics & Statistics, Govt. of Telangana, Hyderabad.

ii) **Maize:** Maize was traditionally a rain- fed crop being cultivated more in Kharif for long. With the introduction of hybrid maize and irrigation development, it began to be cultivated more in Rabi than in Kharif (Fig 2). In the recent period, the area of maize exhibits fluctuations due to scanty water availability, high requirement of fertilisers, infestation of pests and price fluctuations, etc. Another possible explanation is found in high price risk in maize compared to rice, yield being almost the same for rice and maize.



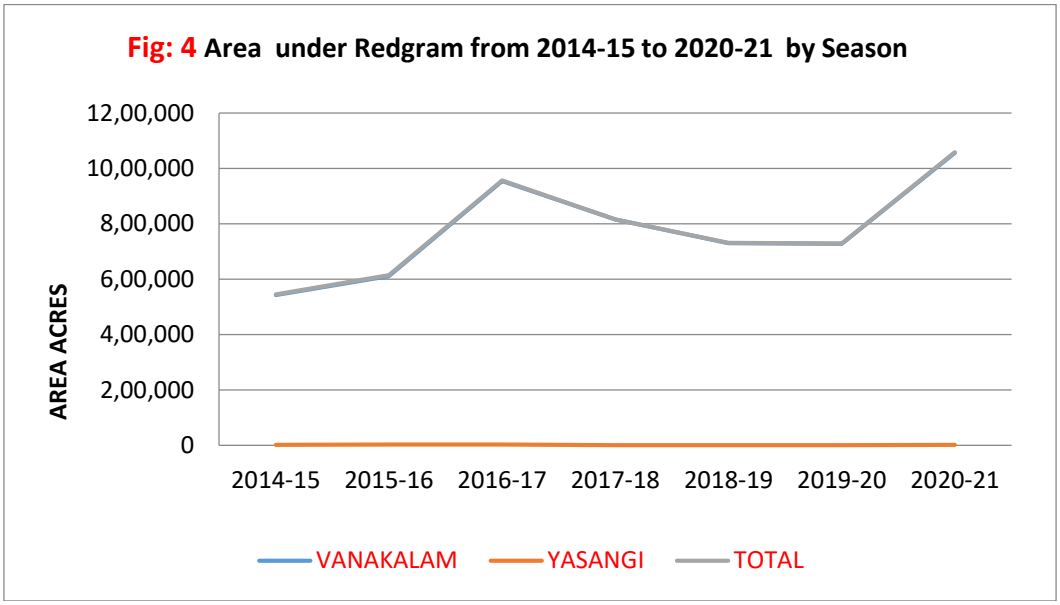
Source: Directorate of Economics & Statistics, Govt. of Telangana, Hyderabad.

iii) **Groundnut:** Hitherto, groundnut was raised as rain-fed crop in Kharif. With increase in irrigation facilities in ground water, the focus of cultivation shifted from Kharif to Rabi on chalka soils (irrigated dry) (Fig 3). Another possible reason may be the low and uncertain yield due to vagaries of monsoon causing dry spells or excess rains at crucial stages and pest infestation. Under controlled conditions, the yield rates are higher in Rabi than in Kharif. Therefore, the area undergroundnut in Rabi determines the overall position of groundnut.



Source: Directorate of Economics & Statistics, Govt. of Telangana, Hyderabad.

iv) **Redgram:** Redgram is essentially a Kharif, rain-fed crop. Most of this crop is raised as a mixed crop with jowar, groundnut, greengram and cotton. The upward spike in 2015-16 was on account of the statementnt of the Chief Minister to increase the crop area under red gram in the State, perhaps, to reduce the deficiency in pulses and towards attaining self-sufficiency (Fig 4). But, as the expected price could not be realised by the farmers, and problems in marketing the area under red gram declined in the subsequent years (Price effect), particularly, in Rabi. The extent of area under Red gram which was relatively more in the beginning period, reduced in the subsequent period in Rabi.

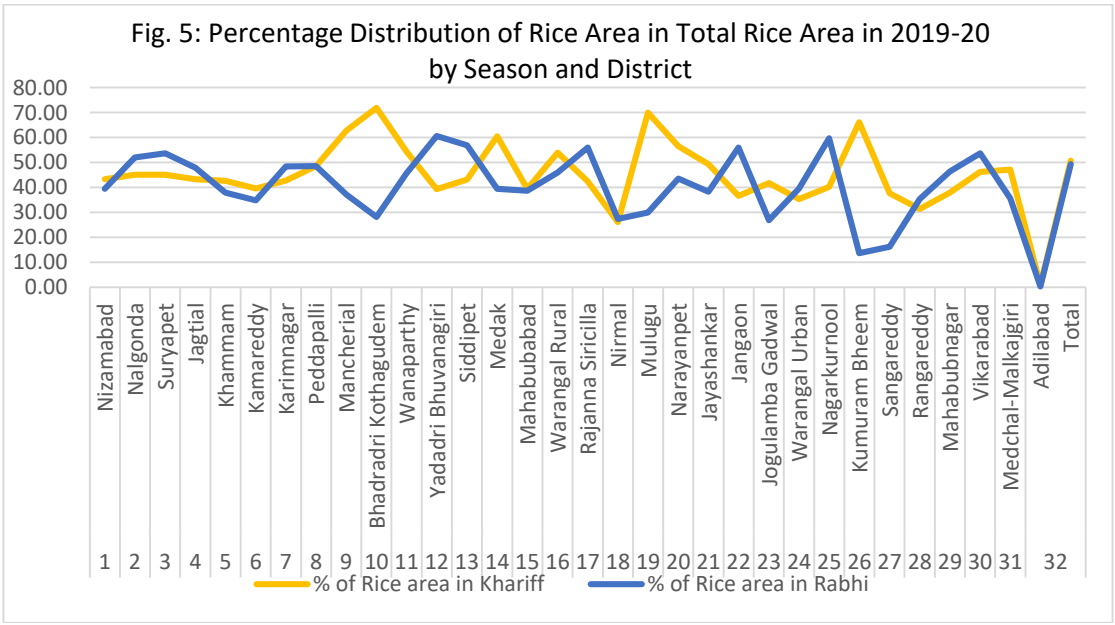


Source: Directorate of Economics & Statistics, Govt of Telangana, Hyderabad

v) **Other Crops:** Soya bean and palm oil (perennial) crops are now introduced as innovative crops while Soya bean is cultivated in few districts like Adilabad, Nirmal in Kharif season. Vegetable crops are increasingly grown more in the urban peripheral areas. The area under sugar cane, tobacco etc.,is declining.

Distribution of Rice Area by Season and Districts for 2019-20

The proportion rice area in Kharif to total Rice area in the district shows variations across districts depending on the level of irrigation in the district as it is water intensive crop.

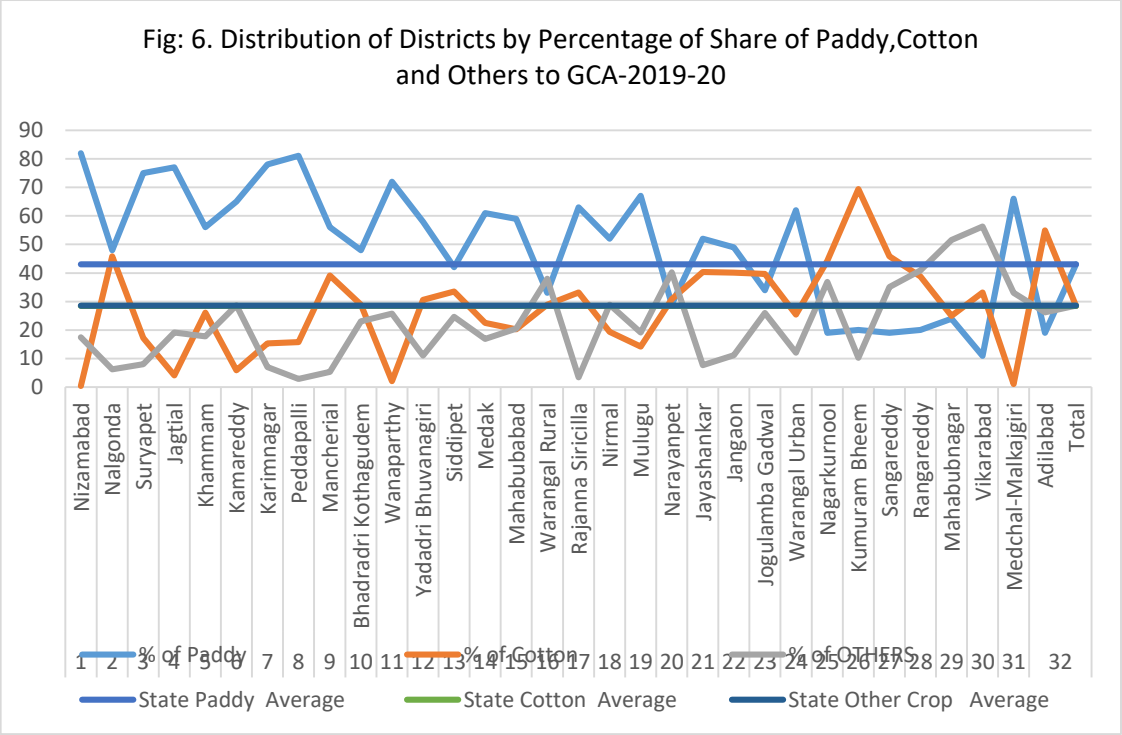


Source: Directorate of Economics & Statistics,Govt of Telangana, Hyderabad

Spatial Distribution of Cropping Pattern

Dis aggregation of crop diversification at the district level shows that wherever the proportion of rice to the district total cropped area is more, the area under cotton is less (Fig:6). The overall percentage of rice in GCA at the State is 43 %. As against this average, 21 districts out of total 33 districts in the State, are having more than this figure. They are Nizamabad, Kamareddy, Jagtial, Karimnagar, Peddapally, MancherialRajanna–Sirsilla and Nirmal in Northern TelanganaZone, Khammam,Medak, Mahabubabad,Jayashankar- Bhupalpally and Warangal Urban, in Central TelanganaZone and Suryapet, Yadadri-Bhuvanagiri and Wanaparthy in Southern TelanganaZone. In the case of Cotton the State average is 28.44 %. There are 17 districts having more

than theaverage. They areAdilabad, KomuramBheem, RajannaSircilla, Jaya Shankar and Mancherial, in Northern Telangana; Bhadradri-Kothagudem, Siddipet, Sangareddy, Warangal Rural and Jangaon, in CentralTelangana;Nalgonda, Vikarabad, Rangareddy,Mahbubnagar,Nagarkurnool, Narayanpet, Yadadri-Bhuvanagiri and JogulambaGadwal in Southern Telangana. For the rest of crops State average is 28.55%, 10 districts cross this average. They areMahbubnagar,Nirmal, Vikarabad, Warangal Rural,Kamareddy, Narayanpet, Nagarkurnool, Sangareddy, Rangareddy and MedchalMalkajigiri. If we take 50 per cent share of a given crop as a measure, 17 districts are with rice, 3 districts in Cotton and 3 districts in other crops.



Source: Directorate of Economics & Statistics, Govt of Telangana, Hyderabad

Factors of Crop Diversification

Crop diversification is a constant process, which determined by several factors such as resource endowment, emerging market conditions, price response (elasticity of supply), crop margins, technology etc.

i) As mentioned earlier, the first phase of crop diversification occurred away from subsistence crops like jowar, greengram, sesamum, groundnut towards rice and maize until 1991(S. Indrakant 2018). HYV technology shifted the balance towards superior foodgrains like rice, maize and for little period Hybrid jowar with increased irrigation under wells. Thereafter, it stabilised for sometime and in the recent period, crop diversification witnessed greater dynamism under the influence of several factors. The basic fundamentals of crop diversification (Earl O Heady 1961), are adjustment to risks and uncertainties attendant in agriculture. The major factor is irrigation development that has improved cultivation in Rabi. Simultaneous programmes of irrigation under Mission Kakatiya and Lift irrigation not only increased the direct irrigation but enriched the ground water and the already well developed motor pump sets and continuous supply of electricity, all in conjecture are providing assured irrigation that provided a greater shift in crop diversification over time (tending to rice), across districts and over season with increased prominence of Rabi cultivation. This helped in minimising uncertainty in yields and bringing greater productivity.

ii)Agricultural ttechnology, as reflected in hybrid seeds, increased mechanisation of agricultural operations through tractor intensity, threshers, harvesters, pump sets etc, has been another great instrument for crop diversification. It has favourable effects on yield, cost, removal of labour scarcity during peak periods.

iii) In the traditional agriculture, farm size had inverse relation with non-food crops. As the new agricultural technology has emerged as neutral to scale, (though not neutral to resources) the influence of farm size could not have much influence in crop diversification. Even under tenancy, similar cropping pattern is observed.

iv) Assured price in the form of MSP, that has minimised the price uncertainty, and purchase by Government that minimised problems in marketing to some extent, as a result rice cultivation become more attractive.

v) In terms of returns, rice showed relative comparative advantage over other crops since the beginning. Non-food crops like Cotton and Chili are subject to periodic fluctuations in yield and price and therefore are more risky and uncertain. In the beginning, cotton showed some higher returns, but that could not be sustained for long. However, compared to the traditional crops, cotton shows some favourable returns and it continues to be the major crop under unirrigated conditions in almost all the districts in the State. In Kharif, it continues to be the major crop.

Perspective on CropDiversification:

1) In the recent period, agriculture share in SGDP has gone up and the crop sector through its diversification could contribute substantially to this. But, the question is whether the concentration of crops in rice and cotton could be sustained in terms of area, yield and returns. The yield is still lower and unstable, cost of cultivation for important crops like Rice Maize, Redgramand Cotton is relatively higher than in many States(Government of Telangana State, Socio-economic Outlook 2017);

2. The focuson irrigation development throughlift irrigation.The question is on sustainability due its high cost in electricity consumption and subsidised electricity to ground waterexploitation;

3. Development of irrigation hascreated economic inequality among highly irrigated districts and rain-dependent districts; How far the new schemes such as Mission Millets, Soyabean promotion, oil palm cultivation in water deficient districts could achieve the intended benefit of bringing down inequalities across districts?

4. Constant cultivation of the same crops each year and each season in respect of rice and cotton areas is likely to have adverse effect on agro-environment, quality of degradingthe soil, increases pest infestation, requiring more and more fertilisers and pesticides that affect future yields adversely.

III. Summary and Conclusion:

During the last three decades the State has witnessed concentration of crops in rice and cotton, together, accounting for more than 70 percent of GCA. More dynamism is witnessed in the last decades, owing to irrigation development, growing intensity of irrigation and conjectural use of flow and ground water. This was made possible on account of adjustment of uncertainty, bringing yield stability, technology infusion, ensuring income stability through MSP and marketing of the agricultural product.

Heavy investment in irrigation development both by the Government and private has yielded benefits to the society in the form of transforming from a deficient state to a surplus in rice production and contributing to the growth of SGDP by increasing the share of agriculture in the recent past.

Though the state reached self-sufficiency in rice production, there are problems in the disposal of the surplus product. Price risk is a continuing problem despite MSP and the inadequateprocurement mechanism. Instability may be on account of growing tenant farming and growing disinterest in agriculture among the farming community.

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